



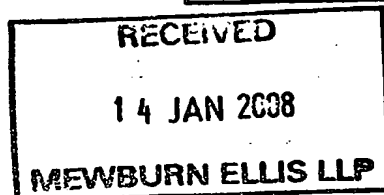
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Date  
14.01.08

Reference GPS/FP6354393	Application No./Patent No. 06250542.5 - 1215
Applicant/Proprietor Shin-Etsu Chemical Co., Ltd.	

### Communication

The extended European search report is enclosed.

The extended European search report includes, pursuant to Rule 62 EPC, the European search report (R. 61 EPC) or the partial European search report/ declaration of no search (R. 63 EPC) and the European search opinion.

Copies of documents cited in the European search report are attached.

☒ 1 additional set(s) of copies of such documents is (are) enclosed as well.

The following have been approved:

☒ Abstract ☒ Title

☐ The Abstract was modified and the definitive text is attached to this communication.

The following figure will be published together with the abstract: NONE

### Refund of the search fee

If applicable under Article 9 Rules relating to fees, a separate communication from the Receiving Section on the refund of the search fee will be sent later.





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
E,X	EP 1 830 371 A (SHINETSU CHEMICAL CO [JP]) 5 September 2007 (2007-09-05) * abstract * * example 1 * * paragraphs [0024] - [0027] * * claim 4 *	1-6	INV. H01F1/057 H01F1/058 H01F1/059 H01F41/02
A	HWANG D H ET AL: "Development of High Coercive Powder From the Nd-Fe-B Sintered Magnet Scrap" IEEE TRANSACTIONS ON MAGNETICS, IEEE SERVICE CENTER, NEW YORK, NY, US, vol. 40, no. 4, July 2004 (2004-07), pages 2877-2879, XP011117004 ISSN: 0018-9464 * page 2878, column 2 - page 2879, column 2 * * figure 5 *	1-6	
D,A	JP 06 244011 A (SUMITOMO SPEC METALS) 2 September 1994 (1994-09-02) * abstract *	1-6	TECHNICAL FIELDS SEARCHED (IPC)
A	WO 2004/114333 A (JAPAN SCIENCE & TECH AGENCY [JP]; MACHIDA KENICHI [JP]; SUZUKI SHUNJI) 29 December 2004 (2004-12-29) * abstract * & EP 1 643 513 A (JAPAN SCIENCE & TECH AGENCY [JP]; MACHIDA KENICHI [JP]) 5 April 2006 (2006-04-05) * abstract * * paragraphs [0018], [0030] * * example 1 *	1-6	H01F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 4 January 2008	Examiner Straub, Florian
CATEGORY OF CITED DOCUMENTS			
X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document		T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons &: member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 25 0542

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

04-01-2008

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1830371	A	05-09-2007	BR PI0506147 A	24-10-2006
			WO 2006043348 A1	27-04-2006
			KR 20070068302 A	29-06-2007
JP 6244011	A	02-09-1994	JP 3471876 B2	02-12-2003
WO 2004114333	A	29-12-2004	CN 1806299 A	19-07-2006
			EP 1643513 A1	05-04-2006
			JP 2005011973 A	13-01-2005
			KR 20060057540 A	26-05-2006
			US 2007034299 A1	15-02-2007
EP 1643513	A	05-04-2006	CN 1806299 A	19-07-2006
			JP 2005011973 A	13-01-2005
			WO 2004114333 A1	29-12-2004
			KR 20060057540 A	26-05-2006
			US 2007034299 A1	15-02-2007

The examination is being carried out on the following application documents:

**Description, Pages**

1-19 as originally filed

**Claims, Numbers**

1-6 as originally filed

**Drawings, Figures**

1-4 as originally filed

Reference is made to the following document; the numbering will be adhered to in the rest of the procedure:

D1: EP-A-1 830 371 (SHINETSU CHEMICAL CO [JP]) 5 September 2007 (2007-09-05)

**Novelty**

European patent application No. EP-A-1 830 371 published on 5 September 2007 claims the priority date of 19 October 2004 (JP20040304543) and the priority date of 27 December 2004 (JP20040377379).

Its content as filed is therefore considered to be comprised in the state of the art relevant to the question of novelty, pursuant to Article 54(3) EPC. This earlier application shows (see passages cited in the European search report):

A thin plate of alloy which is prepared by a so-called strip casting technique, specifically by weighing predetermined amounts of Nd, Co, Al and Fe metals having a purity of at least 99% by weight and ferroboron, induction heating in an argon atmosphere for melting, and casting the alloy melt on a copper single roll in an argon atmosphere. The resulting alloy had a composition of 13.5 atom% Nd, 1.0 atom% Co, 0.5 atom% Al, 5.8 atom% B, and the balance of Fe and is designated Alloy A. Alloy A is hydrided and then heated up to 500 °C for partial dehydriding while evacuating to vacuum.

By this so-called hydriding pulverization, the alloy is pulverized into a coarse powder having a size of up to 30 mesh.

Another alloy is prepared by weighing predetermined amounts of Nd, Tb, Fe, Co, Al and Cu metals having a purity of at least 99% by weight and ferroboron, induction heating in an argon atmosphere for melting, and casting. The resulting alloy has a composition of 20 atom% Nd, 10 atom% Tb, 24 atom% of Fe, 6 atom% B, 1 atom% of Al, 2 atom% of Cu, and the balance of Co and is designated Alloy B. Using a Brown mill in a nitrogen atmosphere, Alloy B is coarsely pulverized to a size of up to 30 mesh.

Subsequently, Alloy A powder and Alloy B powder were weighed in amounts of 90% and 10% by weight, respectively, and mixed together on a V blender which has been purged with nitrogen.

On a jet mill using high-pressure nitrogen gas, the mixed powder is finely pulverized to a mass median particle diameter of 4  $\mu\text{m}$ . The mixed fine powder was compacted in a nitrogen atmosphere under a pressure of about 1 ton/cm<sup>2</sup> while being oriented in a magnetic field of 15 kOe. The compact is then placed in a sintering furnace in an argon atmosphere where it was sintered at 1060 °C for 2 hours, obtaining a magnet block. Using a diamond cutter, the magnet block is machined on all the surfaces.

The machined magnet form is cleaned with an alkaline solution, cleaned with acids and dried. Steps of rinsing with deionized water are included before and after each cleaning step.

Subsequently, dysprosium fluoride having an average particle size of 5  $\mu\text{m}$  is mixed with ethanol at a weight fraction of 50%, in which the magnet form is immersed for one minute with ultrasonic waves being applied. The magnet form is pulled up and immediately dried with hot air. At this point, the filling factor of dysprosium fluoride in the magnet

surface-surrounding space is 45%. The magnet form is subjected to absorption treatment in an argon atmosphere at 900 °C for one hour, then to aging treatment at 500 °C for one hour, and quenched, obtaining a magnet form.

Since the magnet before the treatment does not contain Dy and F, the presence of Dy and F is attributed to the absorption treatment of the invention. Absorbed Dysprosium is only concentrated in proximity to grain boundaries while fluorine is also present at grain boundaries and bonds with oxides, which are contained as incidental impurities within the magnet before the treatment, to form oxyfluorides.

Since all production steps in the prior art document D1 are identical to the present European patent application, the resulting permanent rare earth magnet is the same and is having the same structural, as well as compositional properties.

The attention of the applicant is brought to the fact that a further detailed measurement of the parameter, coercive force of the surface layer of the magnetic body, does not render the subject-matter of the present European patent application novel (Guidelines C IV 9.6).

Thus, the subject-matter of claims 1 to 6 of the present European patent application is not considered to be novel under Article 54(3) and Article 52(1) EPC.

#### Clarity

Independent claim 6 is a method claim, containing the following wording: "A rare earth permanent magnet having a surface layer with higher coercive force than the interior", this is a product technical feature, and as such cannot characterise a process. The characterisation of a process in terms of a product technical feature makes claim 6 unclear with regard to Article 84 EPC. The attention of the applicant is brought to the fact that a deletion of this product technical feature is not allowable either, because of the extension of the subject-matter beyond the content of the application as filed (Article 123(2) EPC).

It seems on the ground of figure 3 and the description on page 14, lines 11 to 14, that there could be a mistake on page 5 of the description of the present application. Actually, in line 36, figure 3 is described as the graph of the dysprosium and fluorine concentration vs. the depth from the magnet surface in M1 and P1. It is believed that only the plot for M1 is to be seen in figure 3.

### Miscellaneous

The applicant is invited to file new claims which take account of the above comments.

It is not at present apparent which part of the application could serve as a basis for a new, allowable claim. Refusal of the application under Article 97(2) EPC is therefore to be expected. Should the applicant nevertheless regard some particular matter as patentable, an independent claim should be filed taking account of Rule 43(1) EPC. The applicant should also indicate how the subject-matter of the new claim differs from the state of the art and the significance thereof.

Amendments should be made by filing replacement pages. Unnecessary recasting of the description should be avoided. An amended abstract is not required. The applicant should also take account of the requirements of Rule 50(1) EPC. If handwritten amendments are submitted, they should be clearly legible to the printer.

In order to facilitate the examination of the conformity of the amended application with the requirements of Article 123(2) EPC, the applicant should clearly identify the amendments made, irrespective of whether they concern amendments by addition, replacement or deletion, and indicate the passages of the application as filed on which these amendments are based (see Guidelines E-II, 1).

If the applicant considers it appropriate, these indications could be submitted in handwritten form on a copy of the relevant parts of the application as filed.

When filing amended claims the applicant should at the same time bring the description into conformity with the amended claims. Care should be taken during revision, especially of the introductory portion and of any statements of problem or advantage, not to add subject-matter which extends beyond the content of the application as originally filed (Article 123(2) EPC).